CLAIMS

1. A radar comprising:

transmitting and receiving means for transmitting a transmission signal alternately repeating an upstream-modulation section in which a frequency gradually increases and a downstream-modulation section in which the frequency gradually decreases and for receiving a reception signal serving as a reflection signal of the transmission signal reflected from a target;

frequency analyzing means for acquiring data on a frequency spectrum of a beat signal for the transmission signal and the reception signal;

pair extracting means for extracting, from among a plurality of first projecting portions appearing in the frequency spectrum of the beat signal in the upstream-modulation section and a plurality of second projecting portions appearing in the frequency spectrum of the beat signal in the downstream-modulation section, a pair of projecting portions caused by reflection of the transmission signal by an identical target; and

means for detecting a distance to the target and a relative speed with respect to the target in accordance with frequencies of two projecting portions forming the pair, wherein

the pair extracting means includes means for predicting

a center frequency of peak frequencies of first and second projecting portions at a timing a certain period of time after a predetermined timing in accordance with a peak frequency of a first projecting portion at the predetermined timing and for extracting a pair of projecting portions acquired at the timing after the certain period of time in accordance with the center frequency.

   2. A radar comprising:

    transmitting and receiving means for transmitting a transmission signal alternately repeating an upstream-modulation section in which a frequency gradually increases and a downstream-modulation section in which the frequency gradually decreases and for receiving a reception signal serving as a reflection signal of the transmission signal reflected from a target;

    frequency analyzing means for acquiring data on a frequency spectrum of a beat signal for the transmission signal and the reception signal;

    pair extracting means for extracting, from among a plurality of first projecting portions appearing in the frequency spectrum of the beat signal in the upstream-modulation section and a plurality of second projecting portions appearing in the frequency spectrum of the beat signal in the downstream-modulation section, a pair of

projecting portions caused by reflection of the transmission signal by an identical target; and

means for detecting a distance to the target and a relative speed with respect to the target in accordance with frequencies of two projecting portions forming the pair, wherein

the pair extracting means includes means for predicting a center frequency of peak frequencies of first and second projecting portions at a timing a certain period of time before a predetermined timing in accordance with a peak frequency of a second projecting portion at the predetermined timing and for extracting a pair of projecting portions acquired at the timing before the certain period of time in accordance with the center frequency.

3. The radar according to Claim 1 or 2, wherein

the pair extracting means extracts the pair of projecting portions by using, as the certain period of time, nT satisfying a relationship, $nT \approx fo/(2\Delta F \cdot fm)$ (here, n represents a desired natural number), where T represents a measurement cycle in which the frequency analysis is performed, $1/fm$ represents a modulation cycle serving as a cycle including the upstream-modulation section and an adjacent downstream-modulation section, fo represents a center frequency of the transmission signal, and ΔF

represents a width of a frequency shift in the upstream-modulation section and the downstream-modulation section.

4. A radar comprising:

transmitting and receiving means for transmitting a transmission signal alternately repeating an upstream-modulation section in which a frequency gradually increases and a downstream-modulation section in which the frequency gradually decreases and for receiving a reception signal serving as a reflection signal of the transmission signal reflected from a target;

frequency analyzing means for acquiring data on a frequency spectrum of a beat signal for the transmission signal and the reception signal;

pair extracting means for extracting, from among a plurality of first projecting portions appearing in the frequency spectrum of the beat signal in the upstream-modulation section and a plurality of second projecting portions appearing in the frequency spectrum of the beat signal in the downstream-modulation section, a pair of projecting portions caused by reflection of the transmission signal by an identical target; and

means for detecting a distance to the target and a relative speed with respect to the target in accordance with frequencies of two projecting portions forming the pair,

wherein

the pair extracting means includes means for predicting a center frequency of peak frequencies of first and second projecting portions at a predetermined timing by using a peak frequency of a first projecting portion at a timing a certain period of time before the predetermined timing and a peak frequency of a second projecting portion at a timing the certain period of time after the predetermined timing and for extracting a pair of projecting portions acquired at the predetermined timing in accordance with the center frequency.

5. The radar according to Claim 4, wherein, when a second projecting portion forming a pair with the first projecting portion at the timing before the certain period of time that is used for predicting the center frequency at the predetermined timing and that exhibits a frequency difference substantially equal to a difference between the peak frequencies of the first and second projecting portions forming the pair at the predetermined timing does not exist and/or when a first projecting portion forming a pair with the second projecting portion at the timing after the certain period of time that is used for predicting the center frequency at the predetermined timing and that exhibits the frequency difference does not exist, the pair

extracting means excludes a combination of the first and second projecting portions at the predetermined timing from pair candidates.